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Electrical characterization and morphological studies of conducting polymer nanofibers

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Doped polyaniline blended with poly(ethylene oxide) has been electrospun in air to give fibers with diameters in the range 3 nm 200 nm. These fibers were captured on wafers of degenerately doped Si/SiO₂ by placing the wafer in the path of the fiber jet formed during the electrospinning process. Individual fibers were contacted using shadow mask evaporation and were also captured on prepatterned wafers. Fibers having diameters greater than 100 nm show a slight increase in the conductivity as compared to the bulk film, while fibers with diameters less than 30 nm had lower conductivity than the bulk. Data on Scanning Conductance Microscopy along the length of individual fibers will be presented. For fibers where the diameter was not uniform, we found that below a certain diameter (~15 nm) the fiber was less conducting as compared to thicker diameter fibers. Dependence of the fiber conductivity on a gate bias is underway and these results will also be presented.



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